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DATAMATION

THIRTIETH ANNIVERSARY ISSUE

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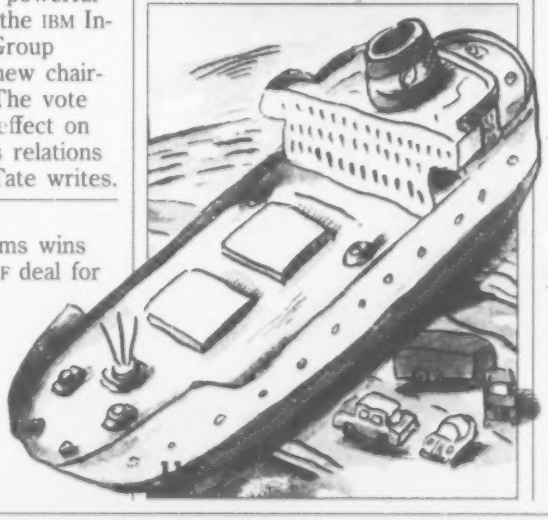

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Cover Photograph by Walter Wick
Typography by James Montalbano

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DATAMATION's Annual Salary Survey
Unix: What Users Are Saying
The Long Shadow of DB2
The Golden Rules of Global Networking

SEPTEMBER 15, 1987
VOLUME 33
NUMBER 18
THIS ISSUE, 190,060 COPIES

1987 JESSE H. NEAL AWARD

Editorial

Taking a Technology Trip

Back in 1957, an industry was born. So was a magazine. DATAMATION was the first to provide in-depth coverage of a technology destined to change the world.

During those 30 years, we've tracked the companies, machines, people, and programs that have helped shape society and the information processing profession. At the same time, DATAMATION has played an instrumental role in helping to shape and define the realm of information technology.

That legacy lives on.

When I began here 11 years ago, I felt a real sense of awe at the respect DATAMATION commanded in the U.S. and abroad. Harking back to my college sorority days, I felt I'd successfully "rushed" DATAMATION and that I was now going to be initiated into the lofty ranks of the most prestigious publication in the computer field. "Congratulate your daughter," I told my mother. "I'm pledging DATAMATION!"

Last January, I made another pledge—to top the editorial package I put together for the magazine's 25th anniversary issue. After much brainstorming, the DATAMATION editors charted an itinerary, a travelogue of articles to take you on a journey through the dramatic changes and trends that have shaped the industry, the technology, and the careers of IS practitioners.

To launch our voyage, we inaugurated the DATAMATION Hall of Fame. After six months of research, we selected a roster of 30 distinguished pioneers of information processing (p. 56).

We held roundtable talks, at which IS pros put their careers and computing in context. Complementing our discussion with veteran IS execs (p. 48) is our panel with tomorrow's technology chiefs (p. 126).

No trip through a number-crunching industry would be complete without numbers, so we've given you a graphic look at the changes that have occurred in the IS arena over the last 30 years (p. 77). We tracked the changes in attitudes toward automation by carefully culling the cartoons in DATAMATION that best characterize the humor of the times (p. 90).

To illustrate just how deeply entrenched technology has become in everyone's professional and personal lives, we took a long day's journey into a world where all the computers go on the fritz (p. 110). Our most ambitious technology tour takes you to the future—to the year 2017, the network age where MIPS factories and AI create a new corporate structure and working environment, a world changed anew (p. 142).

Linda Runyan

LINDA RUNYAN
SENIOR EDITOR

Three Decades By the Numbers

BY PARKER HODGES

In an industry where numbers do much of the talking, it makes sense to let numbers describe some of the changes that have taken place since DATAMATION and this industry began growing up together. In 1957, there were only a few computers shipped, 700 or so. Still, that was a huge jump from the year before, when, according to industry veteran Frederic G. Withington, there were only 500 computers—total—in the U.S. But 1957 was a year holding extraordinary potential for this industry: the transistor was just about to enter the commercial mainstream, transforming all electronics and creating a platform upon which today's information industry would be built.

The industry's explosive growth did not take place in a vacuum, however. The world was changing even as computers changed the world. Figure 1 makes one trend very clear: for three decades, the United States and Western Europe steadily have been losing dominion over the world's gross production. Perhaps most surprising is that the largest percentage decline in the U.S.'s "market share" came during the boom years of the 1960s. Figure 2, describing a 15-year core within recent history,

FIGURE 1 Share of World GNP, By Percent

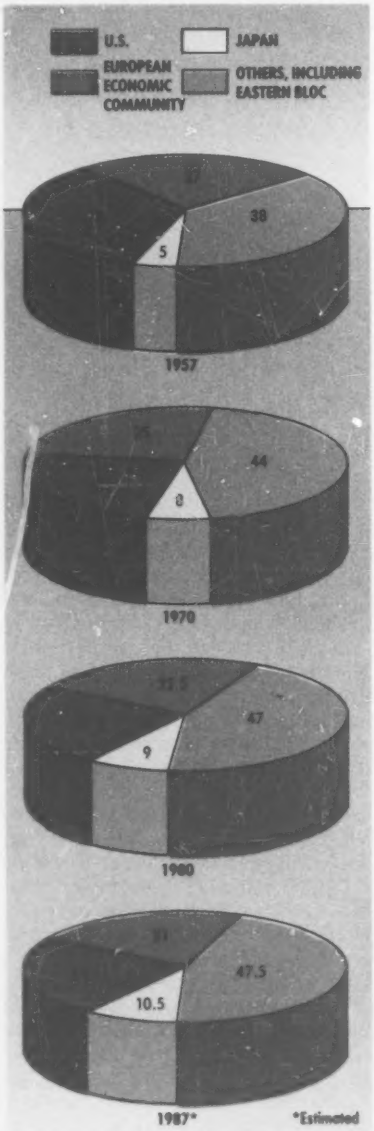


FIGURE 2 U.S. Share of Selected Technology Exports

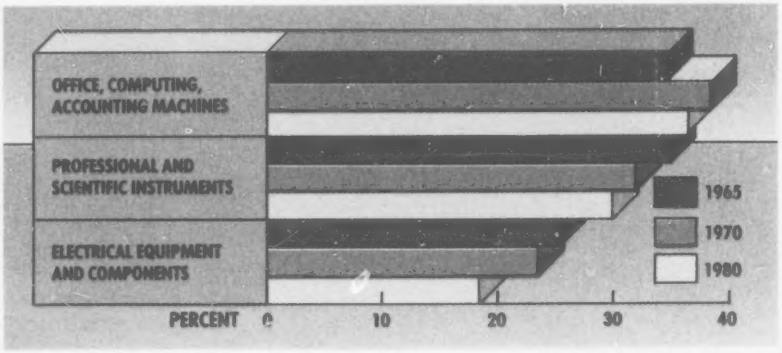
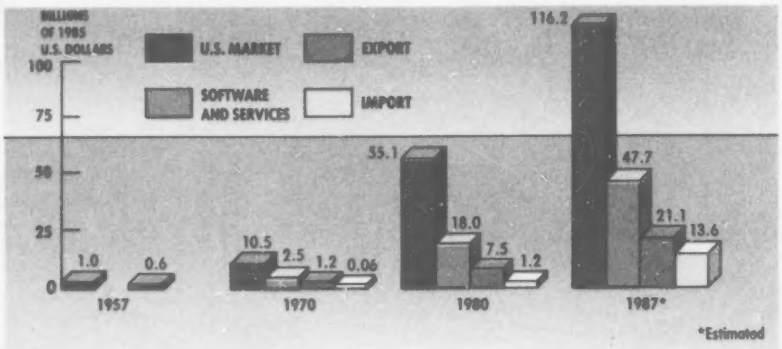


FIGURE 3 U.S. Computer Market—Exports and Imports



Charts by Hayes Cohen

FIGURE 4 U.S. Consumption of Micros, Minis, and Mainframes

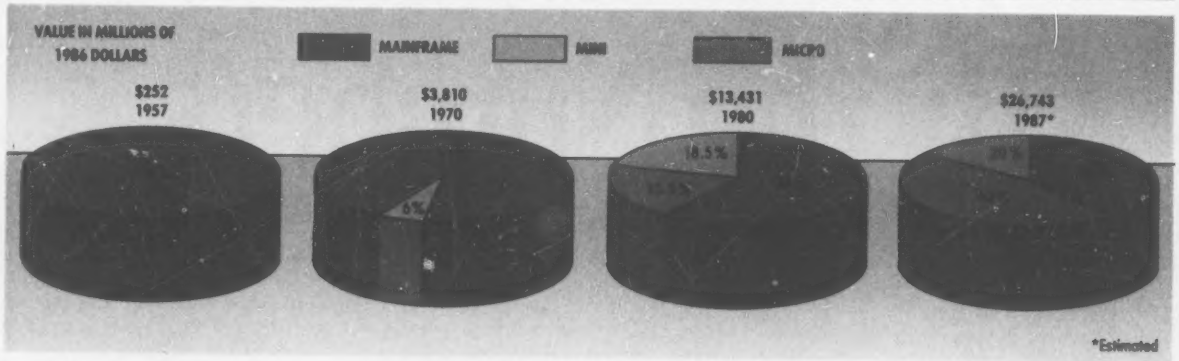


FIGURE 5 Shipments of Micros, Minis, and Mainframes

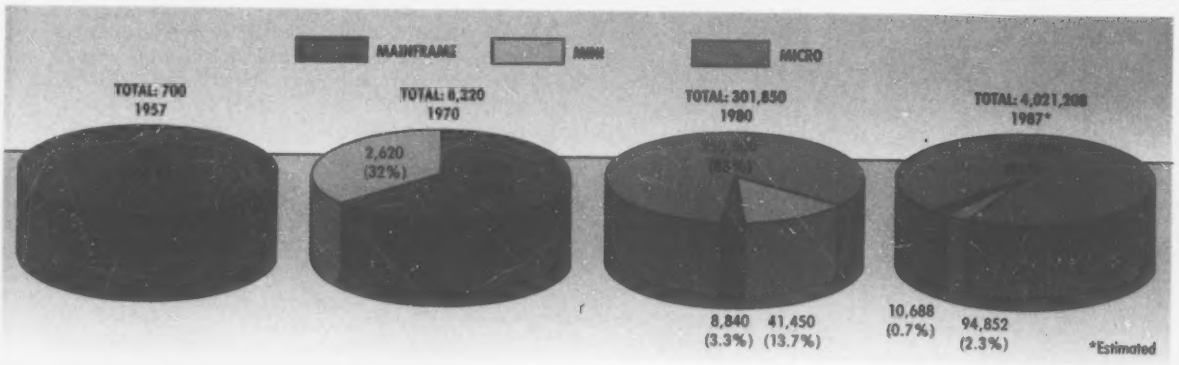
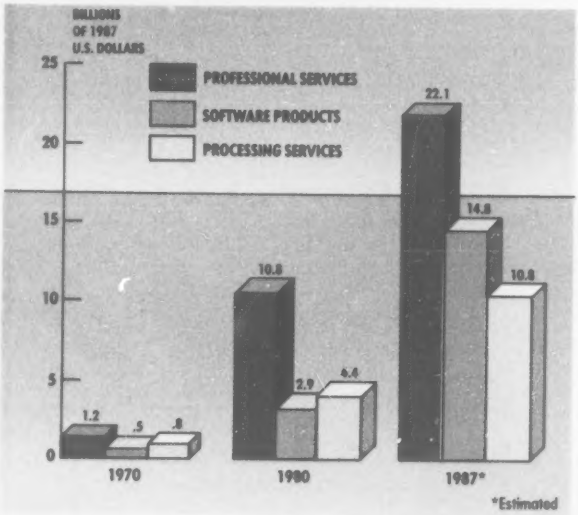


FIGURE 6 The Growing Software And Services Industry



shows how the U.S., in three markets linked to the information industry, has experienced decay in its leadership. Still, so far, the much discussed U.S. trade deficit is *not* in computers and related equipment: DATAMATION estimates the U.S. exported $7.5 billion more in 1987 than it imported (see Figure 3).

What no one apparently dreamed in 1957 is what is so apparent in Figure 4: the birth and blooming youth of the microcomputer. Figure 5 makes this even more evident: U.S. computer shipments are now 5,745 times greater than they were in 1957, and almost half of them are microcomputers. Another booming sector is described in Figure 6: from nonexistent in 1957 to $2.5 million in 1970, the software and services segment of the business this year will reach almost $50 million.

Figure 7 shows the number of workers employed by vendors of computer and telecom equipment and services and in the civilian labor force. In 1960, workers in the computer industry made up just 0.14% of the U.S. civilian labor force. Telecom workers were 0.11%. In 1987, computer industry workers represent 0.41% of the labor force and telecom workers 0.89%.

Figure 8's numbers begin in 1972, the first year in which the Bureau of Labor Statistics began keeping track of them. Figure 8 shows the number of workers in several computer industry occupations. Figure 9 shows how salaries have changed for those employed by the vendors of computers, software, and services. The chart shows the actual dollar amounts, not adjusted for inflation; in purchasing power, therefore, the

FIGURE 7 Computer and Telecom Manufacturing Jobs

(AVERAGE ANNUAL EMPLOYMENT IN THOUSANDS)

	1960	1970	1980	1985	1987*
COMPUTER INDUSTRY	101	191	354	445	501
TELECOM INDUSTRY	820	1,106	1,236	1,058	1,079
CIVILIAN LABOR FORCE	69,628	82,771	106,940	115,461	120,126

*Estimated

employees. While these workers are on the front line of computer occupations, their productivity supports millions of other information workers. Clifford Nass of Stanford University, who has published widely on the sociology of work, told DATAMATION that in 1987 more than 43% of all civilian labor done in the U.S. can be classified as information work. Marcel Porat, in *The Information Economy: Definition and Measurement*, puts the percentage even higher. He suggests that in 1960 information workers made up 46% to 47% of the U.S. workforce. By 1980, almost 54% were information workers, and the percentage has remained relatively flat since then.

The basis for all this activity has been research and development. Figure 10 depicts the way in which U.S. investment in these vital activities has changed over the past three decades. Figure 11 shows how the U.S.'s most powerful trading rival is financing its own R&D activities, specifically how large a piece of Japan's basic information systems work is financed by its powerful PTT. In 1957, when the U.S. was already investing almost $700 million annually on computers, Japan was yet to begin

FIGURE 8 Employment in Some Computer Occupations

(IN THOUSANDS)

YEAR	TOTAL	SYSTEMS ANALYSTS	PROGRAMMERS	COMPUTER & PERIPHERAL EQUIPMENT OPERATORS	COMPUTER & KEYPUNCH EQUIPMENT OPERATORS*	COMPUTER SERVICE TECHNICIANS
1972+	792	75	188	199	284	46
1973	808	87	190	220	255	48
1974	855	99	203	251	251	51
1975	966	124	228	302	253	59
1976	1,000	139	235	295	279	52
1977	1,00[illegible]	132	228	311	284	52
1978	1,155	155	255	403	277	65
1979	1,349	181	330	465	279	94
1980	1,448	205	351	535	271	86
1981	1,492	213	367	564	248	100
1982	1,712	242	434	588	364	84
1983	1,733	276	443	605	311	98
1984	1,815	300	455	630	320	110
1985	1,940	335	485	690	315	115
1987*	2,244	408	563	813	329	131

*Estimated +First year these statistics were compiled

FIGURE 9 Weekly Earnings by Industry Sector

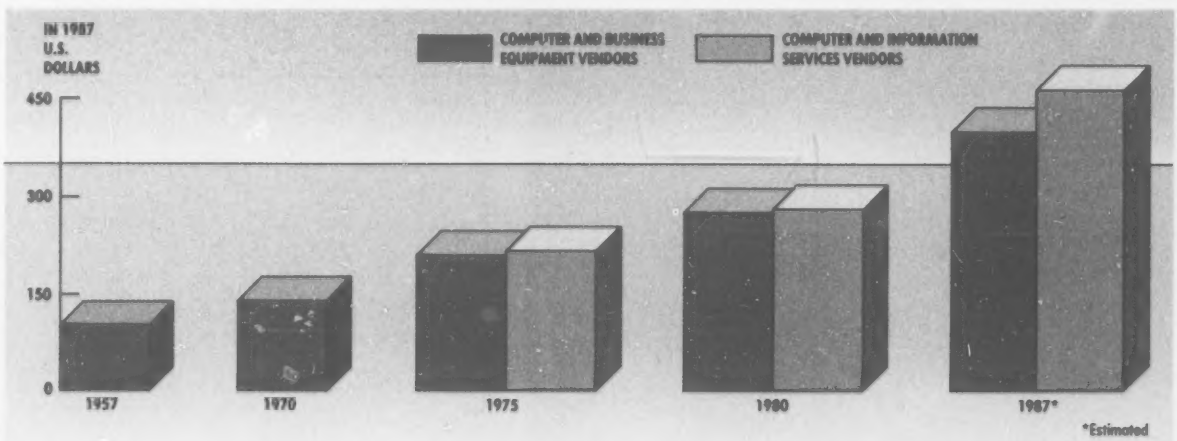


FIGURE 10 U.S. Computer R&D Spending

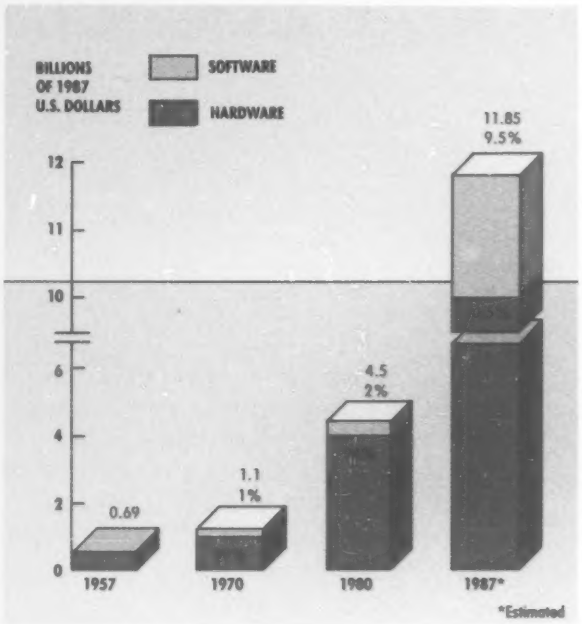
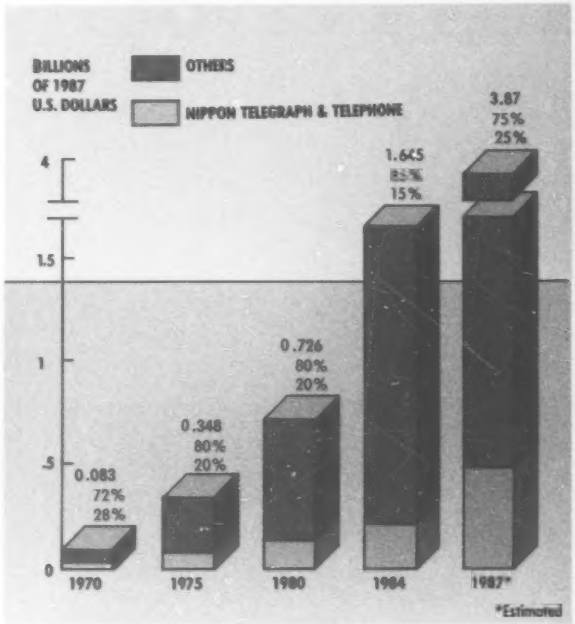


FIGURE 11 Japan's Info Technology R&D



$700 million annually on computers, Japan was yet to begin spending. By 1987, Japanese R&D investment still amounted to less than a third that of the U.S. Figure 12 shows the growth of the industry, the improved efficiency of computing, and the growth in programmers' productivity over three decades.

The last four charts all continue the story of the astonishing change in the cost of computing since the birth of the industry. Figure 13 shows that—while almost everything else was getting more expensive—the average yearly decline of the cost of various system elements over the past three decades ranged between 11% and 27%. As Figure 14 shows, however, inflation in the late 1970s played havoc with prices: for almost a decade, prices rose instead of fell. Still, as can be seen in Figure 15, the cost of a general purpose cpu now is about a third of what it was when DATAMATION began publication (using 1986 dollars and 1957 dollars, respectively). It seems fitting to close, in an issue that focuses on memories, on the cost of computer memory: as Figure 16 clearly shows, nowadays it costs a whole lot less to remember things than it did three decades ago. ■

These charts were assembled by Svein Borgersen of the International Ratio Group, Princeton, N.J. For some of the data in the charts, we are grateful to the following. Figures 1, 3: The U.S. Department of Commerce, International Trade Administration. Figure 2: U.S. Competitiveness in the World Economy, *Bruce Scott and George C. Lodge, Harvard Business School, 1985. Figures 3, 4, 5, 6, 7, 8, and 10: CBEMA Industry Marketing Statistics. Figures 6, 7, 8, and 9: The Bureau of Labor Statistics. Figures 11, 13, 14, 15, and 16:* Targeting the Computer, *Kenneth Flamm, The Brookings Institution, 1987. Figure 12:* Information Processing in the United States: A Quantitative Summary, *edited by Leslie Albin and Kathleen M. Gagne, AFIPS, 1985. Figures 13, 14, and 15:* Data Processing Technology and Economics, *Montgomery Phister Jr., Santa Monica Publishers, 1979.*

FIGURE 12 Indicators of Improvement

INDICATOR	1955	1965	1975	1985
INDUSTRY GROWTH	1	20	80	320
PRICE/PERFORMANCE	1	10^2	10^4	10^6
PROGRAMMER PRODUCTIVITY	1	2	2.7	3.6

FIGURE 13 Decline in Real Cost of Computer Hardware

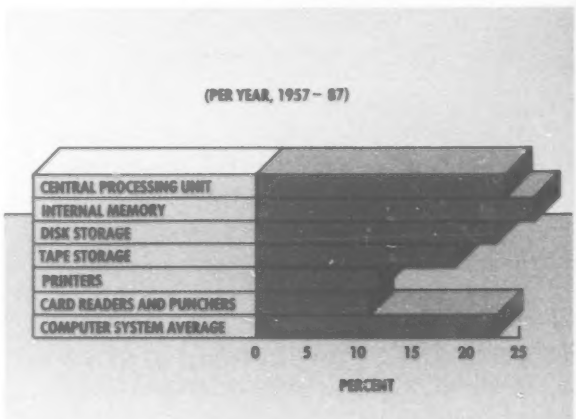


FIGURE 14 Cost Changes for an Average System Without Terminals (PER YEAR, 1957–86)

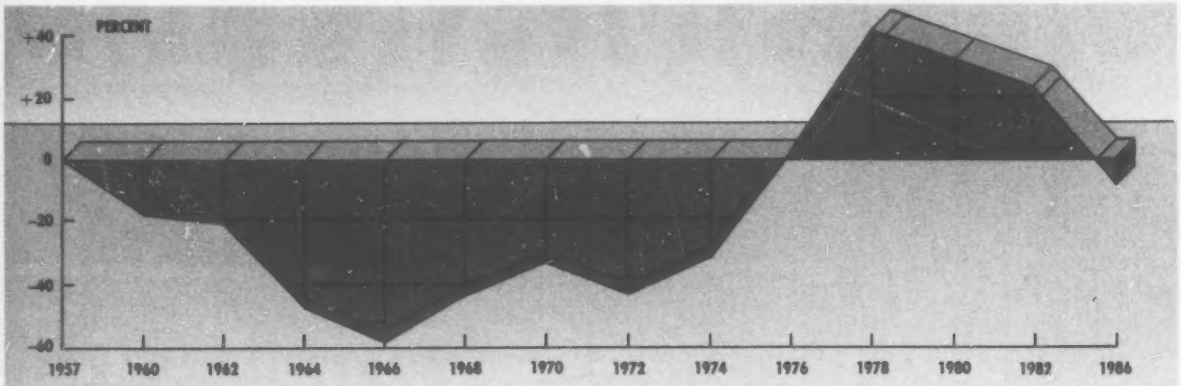
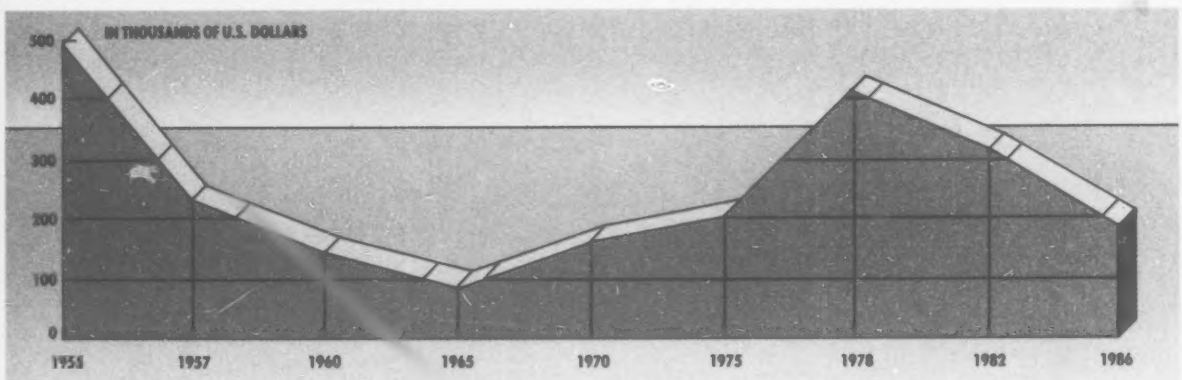


FIGURE 15 Average Price of Cpu*



*General purpose computer, excludes minis and other small computers

FIGURE 16 Average Price of Main Memory Per Byte